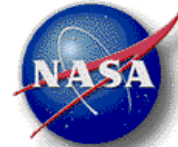




Alpha Magnetic  
Spectrometer NASA / DOE

# *Open Paper Management Tool Open Items Report*



National Aeronautics and  
Space Administration

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*Friday, August 05, 2005*

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## *Open Paper Management Tool (OPMT) Statistics*

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*Total Action Items:* 488

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*Total Action Items Closed:* 393      *Action Items Closed Early:* 45

*Action Items Closed Ontime:* 263

*Action Items Closed Past Due:* 85

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*Total Action Items Open:* 95      *Action Items In Work:* 87

*Action Items Past Due:* 56

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## Open Paper Management Tool (OPMT) Statistics

### List of Action Items Past Due:

<i>Action Item Number:</i>	<i>Date Due:</i>	<i>Action Item Number:</i>	<i>Date Due:</i>	<i>Action Item Number:</i>	<i>Date Due:</i>
<i>Action Item 04-046</i>	<i>07/31/2005</i>	<i>AMS_02-Thermal_CDR-14</i>	<i>06/15/2005</i>	<i>AMS_02-TTCS_PDR-2</i>	<i>07/15/2005</i>
<i>Action Item 04-120</i>	<i>03/31/2005</i>	<i>AMS_02-Thermal_CDR-15</i>	<i>06/15/2005</i>	<i>AMS_02-TTCS_PDR-3</i>	<i>07/15/2005</i>
<i>Action Item 05-013</i>	<i>08/01/2005</i>	<i>AMS_02-Thermal_CDR-17</i>	<i>06/15/2005</i>	<i>AMS_02-TTCS_PDR-4</i>	<i>07/15/2005</i>
<i>AMS_02-ACOP_PDR-05-2</i>	<i>06/01/2005</i>	<i>AMS_02-Thermal_CDR-18</i>	<i>06/15/2005</i>	<i>AMS_02-TTCS_PDR-5</i>	<i>07/15/2005</i>
<i>AMS_02-CDR-08</i>	<i>07/31/2005</i>	<i>AMS_02-Thermal_CDR-29</i>	<i>05/15/2005</i>	<i>AMS_02-TTCS_PDR-6</i>	<i>07/15/2005</i>
<i>AMS_02-CDR-12</i>	<i>03/31/2005</i>	<i>AMS_02-Thermal_CDR-42</i>	<i>07/31/2005</i>	<i>AMS_02-TTCS_PDR-7</i>	<i>07/15/2005</i>
<i>AMS_02-CDR-13</i>	<i>03/31/2005</i>	<i>AMS_02-Thermal_CDR-56</i>	<i>08/01/2005</i>	<i>AMS_02-TTCS_PDR-8</i>	<i>07/15/2005</i>
<i>AMS_02-PDS_CDR-08</i>	<i>05/16/2005</i>	<i>AMS_02-Thermal_CDR-57</i>	<i>06/01/2005</i>	<i>AMS_02-TTCS_PDR-9</i>	<i>07/15/2005</i>
<i>AMS_02-PDS_CDR-09-2</i>	<i>05/16/2005</i>	<i>AMS_02-Thermal_CDR-61</i>	<i>08/01/2005</i>	<i>AMS_02-TTCS_PDR-10</i>	<i>07/15/2005</i>
<i>AMS_02-PDS_CDR-14</i>	<i>05/16/2005</i>	<i>AMS_02-Thermal_CDR-62</i>	<i>08/01/2005</i>	<i>AMS_02-TTCS_PDR-11</i>	<i>07/15/2005</i>
<i>AMS_02-PDS_CDR-17</i>	<i>05/16/2005</i>	<i>AMS_02-Thermal_CDR-68</i>	<i>06/15/2005</i>	<i>AMS_02-TTCS_PDR-12</i>	<i>07/15/2005</i>
<i>AMS_02-PDS_CDR-19</i>	<i>05/16/2005</i>	<i>AMS_02-Thermal_CDR-69-1</i>	<i>06/15/2005</i>	<i>AMS_02-TTCS_PDR-14</i>	<i>07/15/2005</i>
<i>AMS_02-PDS_CDR-23-2</i>	<i>05/16/2005</i>	<i>AMS_02-Thermal_CDR-69-2</i>	<i>06/15/2005</i>	<i>AMS_02-TTCS_PDR-15</i>	<i>07/15/2005</i>
<i>AMS_02-Thermal_CDR-03</i>	<i>06/15/2005</i>	<i>AMS_02-Thermal_CDR-77</i>	<i>07/31/2005</i>	<i>AMS_02-TTCS_PDR-16</i>	<i>07/15/2005</i>
<i>AMS_02-Thermal_CDR-06</i>	<i>06/15/2005</i>	<i>AMS_02-Thermal_CDR-78</i>	<i>07/31/2005</i>	<i>AMS_02-TTCS_PDR-17</i>	<i>07/15/2005</i>
<i>AMS_02-Thermal_CDR-09-2</i>	<i>06/15/2005</i>	<i>AMS_02-TTCS_PDR-1</i>	<i>07/15/2005</i>	<i>AMS_02-TTCS_PDR-18</i>	<i>07/15/2005</i>

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## *Open Paper Management Tool (OPMT) Statistics*

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<i>Action Item Number:</i>	<i>Date Due:</i>
<i>AMS_02-TTCS_PDR-19</i>	<i>07/15/2005</i>
<i>AMS_02-TTCS_PDR-20</i>	<i>07/15/2005</i>
<i>AMS_02-TTCS_PDR-21</i>	<i>07/15/2005</i>
<i>AMS_02-TTCS_PDR-23</i>	<i>07/15/2005</i>
<i>AMS_02-TTCS_PDR-25</i>	<i>06/30/2005</i>
<i>AMS_02-TTCS_PDR-26-1</i>	<i>06/15/2005</i>
<i>AMS_02-TTCS_PDR-26-2</i>	<i>07/15/2005</i>
<i>AMS_02-TTCS_PDR-27</i>	<i>06/30/2005</i>

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## *Open Action Items Report*

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**Open Item Number:** 04-046

**RID Open Date:** 8/1/2004

**Title:**

**Initiator(s):**

**Description:**

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### *Action Item Information*

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**Actionee(s):** Bill Hungerford/AMS  
Trent Martin/EA

**Action Due Date:** 7/31/2005

**Action:** *Build an integrated logic flow, assembly, and test schedule for the payload at CERN. Include a clear plan for Quality Control and MRB authority. Include iterative electrical/functional testing to ensure adequate operation of hardware/software before access to any given crate or detector is no longer possible.*

**Action Status:** 8/3/2005 - Final plan still elusive.

*2/09/2005 - We will build an integrated plan at JSC to go through with the AMS Collaboration. The plan will have to be approved by the AMS Collaboration. The plan is to have: (1) NASA representative at CERN for the integration process and (2) NASA provide a quality representative to be at CERN at all time for quality control during integration process.*

*08/01/04 - Plan due by 09/18/04; Questionnaire sent to detector groups to initiate process. Meeting scheduled at CERN Sept 13 and 14, chaired by Giuliano Laurenti, to consolidate and refine inputs from various detector and sub-system groups. Should result in development of preliminary schedule for review at October TIM*

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## Open Action Items Report

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**Open Item Number:** 04-051

**RID Open Date:** 8/1/2004

**Title:**

**Intiator(s):**

**Description:**

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### Action Item Information

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**Actionee(s):** OZ/Bob Miley

**Action Due Date:** 8/30/2005

**Action:** Complete and sign AMS PIA.

**Action Status:** 8/19/2005 - Hartman meeting moved to 8/19. PIA CR scheduled to be released 8/30. PIA scheduled to be signed 12/1.

05/25/2005 - Meeting scheduled with Dan Hartman on 7/13 to resolve all final issues, PIA scheduled to be signed on 8/30. Specific TBDs being transferred into new OPMT items 05-010, 05-011, and 05-012.

03/02/05 - It will be three weeks before it is known the amount of power to be provided. It will not be 3kW. Win Reid/OZ to set up meeting with Chris Tutt, Trent Martin, Craig Clark, John Cornwell, and Henry Hoang. Due date for this action item was changed to June 30, 2005.

02/09/05 - ISS ICD – turning in PIA baselined first. Plan to remove the TBRs. Win Reid to check on the actions on the ISS side.

12/10/04 - ISS ICD to be released 02/05; question how to get into official documentation.

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## *Open Action Items Report*

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**Open Item Number:** 04-056

**RID Open Date:** 8/1/2004

**Title:**

**Intiator(s):**

**Description:**

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### *Action Item Information*

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**Actionee(s):** Chris Tutt/ESCG  
Bill Hungerford/AMS  
Paul Nemeth/ESCG

**Action Due Date:** 8/15/2005

**Action:** *Provide the plan for Surveillance of Safety Critical assembly and test steps of Collaboration Hardware.*

**Action Status:** *8/3/2005 - Chris Tutt to review current schedule and SVMs and send out verification requests to relevant parties. MVP still in work, so Surveillance Plan on hold.*

*2/9/2005 - Mike Fohey and David Kaplan to discuss the MVP schedule. The MVP is a deliverable on the ESCG contract and is to be delivered no later than 8 months from February 1, 2005.*

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## *Open Action Items Report*

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**Open Item Number:** 04-120

**RID Open Date:** 12/6/2004

**Title:**

**Initiator(s):**

**Description:**

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### *Action Item Information*

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**Actionee(s):** Leland Hill/ESCG

**Action Due Date:** 3/31/2005

**Action:** Work with all AMS experimenters to close out all open issues associated with the Phase II Flight Safety Review Safety Data Package.

**Action Status:** 8/3/2005 - Many issues resolved, but cryomagnet and TTCS still have major open items.  
06/29/2005 - Letter has been distributed to the collaboration.  
05/25/2005 - Letter describing all open actions has been prepared and forwarded to Prof. Ting.  
04/27/2005 - New set of actions in work. Some actions have been answered. Addressing specific organizations/individuals that have not responded. Safety package should be ready by the end of June to distribute to the collaboration approximately two weeks before the July TIM. Responses from the collaboration will be due prior to or during the TIM. The safety package will be updated and redistributed to the collaboration after the TIM. Trent Martin/EA2 requested to see a status of action items at each CCB/Tag-up meeting. Per Trent Martin/EA2, hold firm to the May 31st due date for new list of action items.  
01/19/05 - Some data has been received since the October TIM and January TIM; Some data not due until March 2005; Due date was changed from 01/31/05 to 03/31/05; Final Safety Data Package due 03/08/05.

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## *Open Action Items Report*

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**Open Item Number:** 05-010

**RID Open Date:** 5/25/2005

**Title:** Input Fiber Channels

**Intiator(s):**

**Description:**

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### *Action Item Information*

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**Actionee(s):** Bob Miley/OZ

**Action Due Date:** 9/30/2005

**Action:** AMS PIA requests use of two input fibers by ACOP on a permanent basis. This configuration needs to be approved by OZ and documented in the ICD. Negotiate agreement between ISS and AMS for use of two input fibers and document agreement in ICD.

**Action Status:**

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## *Open Action Items Report*

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*Open Item Number:* 05-011

*RID Open Date:* 5/25/2005

*Title:* Total Power Usage by AMS-02

*Initiator(s):*

*Description:*

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### *Action Item Information*

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*Actionee(s):* Bob Miley/OZ

*Action Due Date:* 9/30/2005

*Action:* AMS PIA requests 2800 W power in worst case conditions. Allowed maximum power consumption by AMS needs to be agreed with ISS program and documented in the ICD.

*Action Status:*

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## *Open Action Items Report*

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*Open Item Number:* 05-012

*RID Open Date:* 5/25/2005

*Title:* S-Band Usage

*Intiator(s):*

*Description:*

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### *Action Item Information*

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*Actionee(s):* Bob Miley/OZ

*Action Due Date:* 9/30/2005

*Action:* AMS PIA requests an average of 10 bytes/sec of Critical Health Data be transferred through the S-band antenna.  
Negotiate agreement between ISS and AMS On S-band usage and document in ICD.

*Action Status:*

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## *Open Action Items Report*

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**Open Item Number:** 05-013

**RID Open Date:** 5/25/2005

**Title:** HRDL Connectors

**Initiator(s):**

**Description:**

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### *Action Item Information*

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**Actionee(s):** Win Reid/OZ

**Action Due Date:** 8/1/2005

**Action:** Provide HRDL connectors to ACOP as GFE.

**Action Status:** 8/3/2005 - Tim and Dewey to look at cable length requirements and re-evaluate number of connectors needed. Peter Dennett to provide front panel diagram to Win Reid. Dewey also evaluating other connector sources.

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## *Open Action Items Report*

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*Open Item Number:* 05-015

*RID Open Date:* 8/3/2005

*Title:* MLI Specification

*Intiator(s):* Trent Martin/EA

*Description:* AMS-02 MLI Specification needed.

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### *Action Item Information*

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*Actionee(s):* John Cornwell/EC

*Action Due Date:* 8/15/2005

*Action:* Develop AMS-02 MLI specification.

*Action Status:*

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## Open Action Items Report

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**Open Item Number:** AMS\_02-ACOP\_PDR-01

**RID Open Date:** 3/9/2005

**Title:** Transfer Rate Ambiguities

**Intiator(s):** Mike Capell/AMS

**Description:** *There is a lack of consistency and lack of clarity in the data rate requirements for AMS and ACOP. ACOP documents are mostly correct in showing 4Mbit/s as a requirement but this has been interpreted to mean that the AMS-02 data rate has been increased.*

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### Action Item Information

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**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** *Implement a clear explanation of the data rates for ACOP and AMS-02, including expected average data rates and supported peak data rates. Provide a simple diagram showing the AMS data source, internal buffer s (JBU) , ACOP and downlink with these data rates.*

*Suggested text:*

*The AMS-02 experiment has been designed to meet its physics goals when producing data at an average rate of 2MBit/s. Data is produced continuously. However, the physics that will be measured is unknown, and so are the peak and average data rates -- 2Mbit/s average is the best estimate. Within AMS-02 a four-fold redundant 1GByte buffer (JBU) is provide to smooth the data flow and to allow for short term (less than an hour) interruptions in the data output from AMS, for example when the hard disk drives are being swapped within ACOP. After any such interruption, the data rate capability in ACOP must be able to make up for the lost time while not falling behind on the fresh data. Therefore ACOP should be able to process data at a rate of at least twice the average data rate from AMS, namely 4Mbit/s.*

**Action Status:** *To be completed with the ACOP CDR Data Pack Submittal.*

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-02

**RID Open Date:** 3/9/2005

**Title:** Incorrect Base Document for Payload Integration Agreement

**Intiator(s):** Mike Capell/AMS

**Description:** *Description of Problem:*

*This document was based from SSP-52000-EIA-ERP Issue A. The ISS program now requires this document be based on SSP57066.*

*Recommendation:*

- 1. Recreate this document from the correct base.*
- 2. Provide the broadest range of transportation options (STS Middeck, MPLM, ATV, Progress, Skyhook).*
- 3. Show relationship to JSC-57113 (AMS-02 PIA) which levies ACOP requirements as well.*

*Impact if recommendation not implemented:*

*ACOP may not meet its internal requirements but not be allowed to fly.*

*Proposed Resolution:*

*Update documentation to match with current NASA requirements.*

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### *Action Item Information*

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**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** Update documentation

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-04

**RID Open Date:** 3/9/2005

**Title:** Front Panel LCD Display

**Intiator(s):** Mike Capell/AMS

**Description:** AMS-02 has a mission success motivated requirement that the crew be able to rapidly respond to AMS-02 off-nominal issues. The design detailed in this specification does not fulfil this requirement. In particular the design does not have the self-sufficient means to display ad-hoc information.

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### *Action Item Information*

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**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** The AMS-02 top level functional requirements (see “ACOP Design Report” ACP-RP-CGS-003 Issue 1 Section 4.1 Page 16) should be mentioned in Section 4.2, page 17 of this document. Any discrepancies from the AMS-02 top level functional requirements should be formally noted in ACP-SY-CGS-001. ACP-SY-CGS-001 should specify an LCD. The LCD should be not less the 320x240 dots with 8 bits of color. The LCD should be not less then 4 inches diagonal.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-05-2

**RID Open Date:** 3/9/2005

**Title:** Clarify Software Responsibilities Between CGS, ASI, and AMS-02

**Intiator(s):** Mike Capell/AMS

**Description:** There needs to be clarification on software responsibilities based on the delivery of application software from ASI to CGS and low level software from CGS (see ACP-PL-CGS-003 Section 2.2, Page 5).

1. The ultimate source of application software should be identified as the AMS-02 Collaboration (also in ACP-PL-CGS-003).
2. ACP-SQ-CGS-001 should have requirements segregated between application (AMS-02 developed /“ASI” delivered) and low level (CGS developed).
3. The cooperation in software development should be directly addressed in the ACP-PL-CGS-003 Section 7.2 Interfaces Management, Page 14. It would be difficult for ASI to directly participate in this loop.

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### *Action Item Information*

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**Actionee(s):** Roberto Battiston, Mike Capell

**Action Due Date:** 10/15/2005

**Action:** CGS will specify the proposal for requiriements to be applied to the contract related to the development of the Application SW. This will include at least the document ACP-SQ-CGS-001, delivered in the PDR data package.

**Action Status:**

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-06

**RID Open Date:** 3/9/2005

**Title:** List of Spare Parts No Longer Matches the ACOP Design

**Intiator(s):** Mike Capell/AMS

**Description:** The list of spare parts no longer matches the ACOP design.

*The spare parts list should be modified as follows:*

- (2) Hard Disks
- (1) ACOP-SBC
- (1) ACOP-T101
- (1) ACOP-T102
- (1) ACOP-T103
- (1) ACOP-PS
- (1) ACOP Power cable
- (1) ACOP Data cable
- (1) Fan with mounting kit
- (1) Exchangable Filter, if filters are implemented.

*In general it should be noted that the exact spares to be provided will need to be adjusted if the design evolves.*

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### *Action Item Information*

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**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** Update spare parts list.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-07-1

**RID Open Date:** 3/9/2005

**Title:** ACOP Hard Drive Sparing

**Intiator(s):** Winston Reid/United Space Alliance

**Description:** The required hard drive sparing is incorrect. Paragraph 4.2 states that a set of 4 hard drives will provide 20 days of recording capability and that 20 spare drives will provide 150 days of recording capability. Dividing the 150 day goal by 20 days tells you that ACOP needs 7.5 sets of hard drives to satisfy the 150 day requirement. Since there are 4 hard drives in each set, a total of 30 spare hard drives (4x7.5) are needed to be meet the 150 day sparing goal. But since ACOP drives are swapped 4 at a time, the number of spare or stowed hard drives must be increased to 32.

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### *Action Item Information*

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**Actionee(s):** Peter Dennett

**Action Due Date:** 10/15/2005

**Action:** Develop traffic model.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-07-2

**RID Open Date:** 3/9/2005

**Title:** ACOP Hard Drive Sparing

**Intiator(s):** Winston Reid/United Space Alliance

**Description:** The required hard drive sparing is incorrect. Paragraph 4.2 states that a set of 4 hard drives will provide 20 days of recording capability and that 20 spare drives will provide 150 days of recording capability. Dividing the 150 day goal by 20 days tells you that ACOP needs 7.5 sets of hard drives to satisfy the 150 day requirement. Since there are 4 hard drives in each set, a total of 30 spare hard drives (4x7.5) are needed to be meet the 150 day sparing goal. But since ACOP drives are swapped 4 at a time, the number of spare or stowed hard drives must be increased to 32.

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### *Action Item Information*

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**Actionee(s):** Peter Dennett

**Action Due Date:** 10/15/2005

**Action:** Update documentation.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-11-2

**RID Open Date:** 3/9/2005

**Title:** ACOP Transport Vehicle Prematurely Identified

**Intiator(s):** Winston Reid/United Space Alliance

**Description:** *Description of Problem:*

*The second sentence implies that ACOP would only be transported to orbit via Shuttle.*

*Recommendation:*

*Change ``ACOP will be transported inside the Shuttle in power off condition`` to ``ACOP will be transported to orbit in a power off condition.``*

*Impact if recommendation not implemented:*

*The statement would remain incorrect. ACOP will be transported to orbit in an unpowered condition, however, the transport vehicle may be non-Shuttle.*

*Proposed Resolution:*

*Update document to include all possible vehicles.*

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### *Action Item Information*

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**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** Update documentation.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-14

**RID Open Date:** 3/9/2005

**Title:** ACOP Hard Drive Replacement Clarification

**Intiator(s):** Winston Reid/United Space Alliance

**Description:** *Description of Problem:*  
*Sentence did not translate properly from Italian to English.*

*Recommendation:*  
*Change sentence from: "The crew should plug out and in the 4 Hard Drives every about 20 days" to "The crew should remove 4 full hard drives and replace them with 4 empty hard drives from the logistics spares approximately every 20 days."*

*Impact if recommendation not implemented:*  
*Requirement would remain unclear in this document.*

*Proposed Resolution:*  
*Document will be updated*

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### *Action Item Information*

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**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** Update documentation.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-16

**RID Open Date:** 3/9/2005

**Title:** EXPRESS IDD Page Reference

**Intiator(s):** Winston Reid/United Space Alliance

**Description:** *Description of Problem:*

*Many paragraphs within Section 10 contain a reference to a specific requirements page within the EXPRESS IDD. This is not a good idea because the information being referenced may move between document revisions.*

*Recommendation:*

*Instead of referencing a page, make the reference to the specific IDD paragraph number and book revision level. For example, USE: ``SSP52000-IDD-ERP, Rev E, Figure 3-8A`` instead of: ``SSP52000-IDD-ERP P3-18``.*

*Impact if recommendation not implemented:*

*Payload risks referencing wrong requirements paragraphs.*

*Proposed Resolution:*

*Document will be updated*

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### *Action Item Information*

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**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** *Update documentation.*

**Action Status:** *To be completed with the ACOP CDR Data Pack Submittal*

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-17

**RID Open Date:** 3/9/2005

**Title:** ACOP Transmit/Receive Data Rates

**Intiator(s):** Winston Reid/United Space Alliance

**Description:** *Description of Problem:*

*Figure 5.1 provides an excellent diagram of AMS/ACOP data interfaces and connectivity. However, it does not provide the specific data rates that are driving the design of the payload and its interfaces to ISS.*

*Recommendation:*

*Update Figure 5.1 to explicitly identify the payload data rates (typical and max) required on each ISS connection between AMS and ACOP.*

*Impact if recommendation not implemented:*

*Additional insight to payload design requirements would be missing.*

*Proposed Resolution:*

*We understand the request, but it may not be easy to implement.*

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### *Action Item Information*

**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** Update Figure 5.1

**Action Status:**

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-18

**RID Open Date:** 3/9/2005

**Title:** ACOP Door Access

**Intiator(s):** Tracy R. Gill/NASA-KSC

**Description:** On Express Racks, locker 4 and 8 positions will not allow the locker doors to open fully (opens just past 90 degrees) because they come into contact with the bottom shelf. The ACOP front panel door appears to not need to go much beyond 90 degrees of opening to allow for drive and board installation. It may not be a problem at all. Attached is a photo showing a single stowage locker door opening. There was a a problem found at KSC with a payload installing hardware that needed the door to open fully, but due to position 8, shelf and the structure ribs on the door did not allow for payload installation of hardware.

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### *Action Item Information*

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**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** Investigate potential issue and, if problem discovered, propose solution.

**Action Status:**

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-19-2

**RID Open Date:** 3/9/2005

**Title:** ACOP Bolt Analysis Requirements

**Intiator(s):** Bruce Sommer/ESCG

**Description:** *Description of Problem:*

*Bolt analysis in report does not follow NASA's guidelines for bolt analysis as specified in NSTS 08307  
"Space Shuttle Criteria for Preloaded Bolts".*

*Recommendation:*

*Revise ACOP bolt analysis to meet the requirements specified in NSTS 08307.*

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### *Action Item Information*

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**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** Update bolt analysis

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal.

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-23

**RID Open Date:** 3/9/2005

**Title:** Command APIDs

**Intiator(s):** Richard Weaver/Teledyne Brown Engineering

**Description:** - ACP-SQ-CGS-001 Paragraph 1.1 and 1.2 describe an EXPRESS Payload Application running on the EXPRESS Laptop Computer (ELC). There is no mention of a ACOP Payload application for a Portable Computer System (PCS) (i.e. computer deployed on the PL MDM 1553 bus or the C&C 1553 bus).  
- Section 6.3.2 in the ACOP Interface Specification ICD list APIDs for PCS to LAP@ & LAP4 ISPRs. These APIDs are not needed.  
- Section 6.3.2 in the ACOP Interface Specification ICD list APIDs for MCC-H to LAP@ & LAP4 ISPRs. These APIDs are not needed because commands to US Payload ISPRs utilize POIC APIDs.  
- In general, ACOP has not been assigned to a ISPR location, therefore APID deffinition is premature at this stage.

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### *Action Item Information*

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**Actionee(s):** CGS  
Peter Dennett

**Action Due Date:** 10/15/2005

**Action:** Update documents.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-24

**RID Open Date:** 3/9/2005

**Title:** Acoustic Verification Requirement and Testing Clarification

**Intiator(s):** Eric Phillips/Boeing PEI

**Description:** ``Acoustic noise measurement will be performed on the FM only if QM results are marginal``. SSP 57000 requirements (Paragraph 4.3.12.3.3.1) states that acoustic measurements shall be made using actual flight equipment even though prototype or qualification units have been tested previously. This is due to the fact that hardware, such as cooling fans, can have varying noise signatures even though part numbers are identical.

---

### *Action Item Information*

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**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** SSP-52000-IDD-ERP Table 4-IX is the sub-rack level specification. Testing will be done on the QM. Testing should be done on all flight models unless the noise source is an insignificant noise. SSP-57000 describes an insignificant noise source as 37 dBA at 2 feet away in all directions. Update documentation to match this approach.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-ACOP\_PDR-26

**RID Open Date:** 3/9/2005

**Title:** Incorrect Version of SSP 50184

**Intiator(s):** Vergel Romero/Boeing PEI

**Description:** Description of Problem:

Applicable Documents Item 9 is referering to Feb 1996 version of SSP 50184.

**Recommendation:**

Change to SSP 50184 Revision B Dated May 25, 2001

**Impact if recommendation not implemented:**

ACOP will be using an outdated version of the document which was changed considerably.

**Proposed Resolution:**

Will update document.

---

### *Action Item Information*

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**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** Update documentation.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-ACOP\_PDR-28

**RID Open Date:** 3/9/2005

**Title:** Unknown J7 UIP Location

**Intiator(s):** Vergel Romero/Boeing PEI

**Description:** ACP-SP-CGS-001 (6.1.3 fourth bullet) / ACP-RP-CGS-003 (5.4.2 fourth bullet) / ACP-RP-CGS-004 (5.4.2 fourth bullet) contain the following statement: ``TX and RX under TESS (complete mission) and TX under MELFI (as initiation location, may have to move).`` The actual locations of J7 connectors that will be provided to ACOP for use are still unknown. Indicate in the statement that since topology is not finalized, actual locations of J7 connectors are unknown and the length of fiber optic cable may vary.

---

### *Action Item Information*

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**Actionee(s):** CGS  
Peter Dennett

**Action Due Date:** 10/15/2005

**Action:** Update documentation.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-ACOP\_PDR-29

**RID Open Date:** 3/9/2005

**Title:** ACOP Compatibility with EXPRESS Rack Interface

**Intiator(s):** Henry Hoang/Boeing PEI

**Description:** *Description of Problem:*

*SSP 30238 and 30237 need to be included in the “Applicable Documents”.*

*Consequences: ACOP will not compatible with EXPRESS Rack interface and Space Station.*

*Electromagnetic Interference (EMI) and Electrostatic Discharge (ESD) are not addressed in section 5.3.1 “Electrical Interfaces” of this document.*

*Suggestion: Add section 7.0 of SSP 52000-IDD-ERP to paragraph 5.3.1.1 of this document.*

*Consequences: ACOP will not compatible with EXPRESS Rack interface.*

*Provide 28Vdc Interface Block Diagram between the ACOP and EXPRESS including the cable and connector part numbers.*

*Proposed Resolution:*

*SSP 30238 and 30237 are called out by SSP 52000-IDD-ERP, so they do not have to be specifically called out by the ACOP team Section 5.3.1.1 will be updated as recommended.*

---

### *Action Item Information*

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**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** *Update documents as recommended.*

**Action Status:** *To be completed with the ACOP CDR Data Pack Submittal*

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-36

**RID Open Date:** 3/9/2005

**Title:** SSP 52050 Reference

**Intiator(s):** Joseph Breit/IPIC PSI

**Description:** *Description of Problem:*

*Applicable documents lists an outdated version of SSP 52050.*

*Recommendation:*

*Replace reference to SSP 52050 Rev D with SSP 52050 Rev E (November 12, 2002). (Also needs to be updated in ACP-SP-CGS-001 & ACP-SQ-CGS-001.)*

*Impact if recommendation not implemented:*

*ACOP will be designed to out of date requirements.*

*Proposed Resolution:*

*Update references*

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### *Action Item Information*

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**Actionee(s):** CGS  
ASI

**Action Due Date:** 10/15/2005

**Action:** Update documents.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-ACOP\_PDR-37

**RID Open Date:** 3/9/2005

**Title:** HRDL Minimum Packet Size

**Intiator(s):** Joseph Breit/IPIC PSI

**Description:** The document states that ‘‘Transmitter capable to transmit frame from 1 to 4096 bytes length.’’ While this may be true, the HRDL CCSDS packet size requirement (SSP 52050 {3.4.2.4.1.2-A}) is that packets will be from 100 and 4096 bytes length (inclusive). This requirement should be noted to prevent any confusion regarding actual HRDL packet size requirement. (This statement also appears in ACP-SQ-CGS-001, paragraph 2.6.4.

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### *Action Item Information*

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**Actionee(s):** Peter Dennett

**Action Due Date:** 10/15/2005

**Action:** Update document.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-ACOP\_PDR-38

**RID Open Date:** 3/9/2005

**Title:** Minimum Ku-band Packet Length

**Intiator(s):** Joseph Breit/IPIC PSI

**Description:** *Description of Problem:*

*The table defines the minimum packet length (PacketLen) for frames transmitted by AMS as 0 bytes. For Ku-band packets the minimum packet length is 93 bytes. (See SSP 41158 Table 4.1.1.1-1).*

*Recommendation:*

*Change the minimum packet length to 93 bytes.*

*Impact if recommendation not implemented:*

*Incorrectly sized Ku-band packets.*

*Proposed Resolution:*

*Implement recommendation*

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### *Action Item Information*

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**Actionee(s):** Peter Dennett

**Action Due Date:** 10/15/2005

**Action:** Update document.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-ACOP\_PDR-39

**RID Open Date:** 3/9/2005

**Title:** Secondary CCSDS Header Requirements for Telemetry

**Intiator(s):** Joseph Breit/IPIC PSI

**Description:** *Description of Problem:*

*The table, in the PacketID2 row, contains a note that ‘‘Per SSP57002C this is Data Cycle Counter’’. Since AMS telemetry will not be processed by the HOSC, there is no requirement for AMS to implement a Data Cycle Counter in the Secondary Header. (See SSP 52050 Appendix D, paragraph E.)*

*Recommendation:*

*Remove the note.*

*Impact if recommendation not implemented:*

*Possible confusion over CCSDS Header requirements.*

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### *Action Item Information*

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**Actionee(s):** Peter Dennett

**Action Due Date:** 10/15/2005

**Action:** Will remove note from document.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-40-1

**RID Open Date:** 3/9/2005

**Title:** ER3 APIDs

**Intiator(s):** Joseph Breit/IPIC PSI

**Description:** *The APIDs listed for ACOP in ER3 are incorrect (except for the MCC-H to ACOP in ER3 APID, which is correct). This is actually my fault, as an email I sent to Peter Dennett with assigned APID numbers contained cut and paste errors for the ER3 (LAB1P4) locations.*

*The correct APIDs are:*

- 121 - POIC to ACOP in ER3 (LAB1P4)
- 221 - PCS/P1 to ACOP in ER3 (LAB1P4)
- 321 - PCS/P2 to ACOP in ER3 (LAB1P4)
- 421 - PCS/P3 to ACOP in ER3 (LAB1P4)
- 521 - PCS/P4 to ACOP in ER3 (LAB1P4)
- 621 - PCS/P5 to ACOP in ER3 (LAB1P4)

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### *Action Item Information*

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**Actionee(s):** Peter Dennett

**Action Due Date:** 10/15/2005

**Action:** Obtain Boeing document of APIDs.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-41

**RID Open Date:** 3/9/2005

**Title:** ISS Program Assigned APIDs

**Intiator(s):** Joseph Breit/IPIC PSI

**Description:** *Description of Problem:*

*The document states ‘‘The ISS program has assigned the following values to AMS-02: APIDs: 974-983.’’ These values were originally assigned to AMS by PSI, but conflict with the desired AMS usage as documented in Table 6-6. PSI will update ISS program documentation (D684-11372-01) to agree with Table 6-6.*

*Recommendation:*

*Remove the statement in quotes above.*

*Impact if recommendation not implemented:*

*Confusion over which Ku-band APIDs have been assigned to AMS & ACOP.*

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### *Action Item Information*

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**Actionee(s):** Peter Dennett

**Action Due Date:** 10/15/2005

**Action:** *Will confirm with initiator if it is okay to roll this RID in with AMS\_02-ACOP\_PDR-40.*

**Action Status:** *To be completed with the ACOP CDR Data Pack Submittal*

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-42

**RID Open Date:** 3/9/2005

**Title:** Incorrect Requirement Trace for SRD-3.1.13-060

**Intiator(s):** Joseph Breit/IPIC PSI

**Description:** Description of Problem:

The requirements trace for SRD-3.1.13-060 incorrectly references ACP-SP-CGS-001 section 6.3.3.3.9.1. The correct reference should be to section 6.3.3.9.1.

**Recommendation:**

Correct the reference.

**Impact if recommendation not implemented:**

Broken requirements traceability.

**Proposed Resolution:**

Will update

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### *Action Item Information*

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**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** Update document.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-43

**RID Open Date:** 3/9/2005

**Title:** No Traceability to ISS Requirements

**Intiator(s):** Joseph Breit/IPIC PSI

**Description:** Description of Problem:

*The SW Requirement Document provides no traceability to ISS requirements.*

*Recommendation:*

*Update sections 3 & 4 to provide traceability from AMS/ACOP project requirements to ISS requirements.*

*Impact if recommendation not implemented:*

*Impossible to assess AMS/ACOP understanding of ISS interface requirements.*

*Proposed Resolution:*

*Update as recommended and develop a Software Verification Plan based on SSP-52000-PVP and SSP-52050 (for HRDL only).*

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### *Action Item Information*

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**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** *Update as recommended and develop a Software Verification Plan based on SSP-52000-PVP and SSP-52050 (for HRDL only).*

**Action Status:** *To be completed with the ACOP CDR Data Pack Submittal*

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-48-2

**RID Open Date:** 3/9/2005

**Title:** Face Plate Connector Protection

**Intiator(s):** John Stanford/NT

**Description:** Description of Problem:

Determine what loads (bump, kick, incidental) unprotected connectors will sustain (power, data and fiber optics).

**Recommendation:**

Determine current loads for standard ISS connectors. Perform analysis for fiber optics.

**Proposed Resolution:**

PE&I should provide the requirement for the generic power and data connectors for kick loads. ACOP team will determine the best way to apply these loads to the fiber connector.

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### *Action Item Information*

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**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** Determine best way to apply kick loads for fiber connector and complete analysis.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-50-1

**RID Open Date:** 3/9/2005

**Title:** Protection for Fiber Optic Cable

**Intiator(s):** John Stanford/NT

**Description:** Description of Problem:

1. Define the length (or approximate length) of the fiber optic cable.
2. Determine what protection should be provided for the fiber optic cable, including special provisions, and procedures.
3. Determine special safety precautions.
4. Determine additional weight requirements (weight of protection material) based on protection strategies.

**Proposed Resolution:**

We agree that there is a potential issue. OZ will help us to define the length. Protection issue must be taken to safety panel.

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### *Action Item Information*

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**Actionee(s):** Vergel Romero/Boeing PEI

**Action Due Date:** 10/15/2005

**Action:** Determine location and routing of cables.

**Action Status:** 05/11/05 - Win Reid/OZ was directed to work the action item in more detail. Response expected 6/30.

04/27/05 - In work. Vergel Romero/Boeing PEI gave a presentation to Mike Horkachuck/OZ3 in mid-March. Peter Dennett/AMS requested to be part of ACOP discussions. This issue will be discussed at the ACOP Flight Safety Review May 2 and 3. Paul Nemeth/ESCG requested that Mike Horkachuck/OZ3 be asked to attend the ACOP FSR.

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-ACOP\_PDR-54-2

**RID Open Date:** 3/9/2005

**Title:** Correction of Applicable Documents

**Intiator(s):** Leland Hill/ESCG

**Description:** Description of Problem:

ACOP PDR documentation referrences an out of date document for the control of stress corrosion cracking. MSFC-SPEC-522B is used, this document has been replaced by MSFC-STD-3029, ``Guidelines or the Selection of Metallic Materials for Stress Corrosion Cracking Resistance in Sodium Chloride Environments``.

**Recommendation:**

Change all refernces of MSFC-SPEC-522B to MSFC-STD-3029.

**Impact if recommendation not implemented:**

Possible non-compliance with updated standards.

**Proposed Resolution:**

Update the document.

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### *Action Item Information*

**Actionee(s):** CGS

**Action Due Date:** 10/15/2005

**Action:** Update documents.

**Action Status:** To be completed with the ACOP CDR Data Pack Submittal

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## Open Action Items Report

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**Open Item Number:** AMS\_02-CDR-06

**RID Open Date:** 5/1/2003

**Title:** AMS-CDR-1-17: Meteoroid/Orbital Debris Shielding

**Intiator(s):** E. Christiansen/NASA

**Description:** *Shielding from meteoroid/debris impact is inadequate to meet protection requirements. Shielding of pressurized vessels on AMS-02 such as the vacuum case and TRD (as well as any other pressure vessel) is required to prevent catastrophic rupture of these tanks in the event of meteoroid/debris impact which would release high-velocity fragments creating a potentially serious safety issue for on-board crew. The assessed probability of no penetration (PNP) using specified environment models is 0.97 which is far below the specified 0.997 PNP requirement. Updating ballistic limit equations and models as described in the forward work plan does not appear adequate to show compliance with requirements. Additional or significantly enhanced shielding will likely be necessary to meet safety requirements.*

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### Action Item Information

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**Actionee(s):** Dana Lear/ESCG

**Action Due Date:** 7/1/2006

**Action:** *Complete analysis and coordinate design of debris shields. To be completed by Phase III Safety.*

**Action Status:** *05/03/05 - Email from Dana Lear/ESCG to Phil Mott/ESCG, Ross Harold/ESCG, and Trent Martin/EA2. The AMS-02 modeling for the MMOD assessment was completed last week. Additionally, the BUMPER geometry runs have been completed. Since the input scripts have not been run in years, I'm going through and verifying/updating all inputs for both the shield ballistic response definitions (BLEs) and the mission parameters.*  
*02/09/05 - Chris Tutt/ESCG sent an email to Dana Lear/ESCG requesting a letter from Eric Christiansen/KX with the requirements and his signature.*  
*01/19/05 - L. Hill/LMSO to get in touch with D. Lear/LMSO to discuss what L. Hill/LMSO needs for Phase II. C. Tutt/LMSO, P. Mott/LMSO, & R. Harold/LMSO need to be involved. T. Martin/EA stated that anything pressure safety critical needs to be covered.*

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-CDR-08

**RID Open Date:** 5/1/2003

**Title:** AMS-CDR-2-07: Bolt in Sloppy Holes Assured to Take Shear

**Intiator(s):** B. Ritter/GSFC

**Description:** Bolts attaching the support ring to the conical flange were assumed to transfer shear, even though they are in sloppy holes this is non-conservative.

---

### *Action Item Information*

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**Actionee(s):** Chris Tutt/ESCG

**Action Due Date:** 7/31/2005

**Action:** Work with SWG to resolve concerns with compliance with NASA-STD-08307, including bolts in sloppy holes being assumed to take shear.

**Action Status:** 7/22/2005 - Initial VC flange loads obtained with latest model. These loads will be used in the updated analysis.  
6/17/2005 - SWG agrees that 08307 will only apply to safety critical fasteners.  
5/11/2005 - Resolution plan under development. Proposal complete but needs to be written up and approved by Structures Working Group (SWG).  
2/9/2005 - Action item due date was changed to May 31, 2005. Bolt analysis was done to Lockheed Martin standards. Structures Working Group (SWG) has new standards. Currently looking to see how many interfaces have issues and what needs to be done. Action item was changed from 'Work bolt concerns with the SWG.' to 'Work with SWG to resolve concerns with compliance with NASA-STD-08307, including bolts in sloppy holes being assumed to take shear.'

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-CDR-09

**RID Open Date:** 5/1/2003

**Title:** AMS-CDR-2-15: Missing Documents - Structural Analysis

**Intiator(s):** Murthy Pinnamaneni Structures/Boeing

**Description:** The following items were not available in the Data Package: design load factors, dynamic analysis procedure and results. From 2.2.1, AMS Report Outline.doc, Magnetic Strap Analysis and the Coupled Loads Analysis, which are identified to be in "separate sections." Reports/documents that include: Dynamic Loads Analysis Description; Payload/Shuttle Interface Loads; Trunnion Deflection; Trunion Misalignment Loads; and Uncertainty Factors Used in the Analysis.

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### *Action Item Information*

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**Actionee(s):** Chris Tutt/ESCG

**Action Due Date:** 7/1/2006

**Action:** Update stress report and dynamics analyses reports. To be completed by Phase III Safety Data Pack.

**Action Status:**

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-CDR-12

**RID Open Date:** 5/1/2003

**Title:** AMS-CDR-4-18: Presentation Issues

**Initiator(s):** H. Hoang/PEI  
J. Fu/PEO

**Description:** The presentation for avionics is not adequate for documentation purpose to show compliance with SSP 57003 requirements.

---

### *Action Item Information*

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**Actionee(s):** Tim Urban/ESCG

**Action Due Date:** 3/31/2005

**Action:** Supply document listing EMI/electrical specs.

**Action Status:** 06/29/2005 - Tim Urban/ESCG to update PIH ICD based on Henry Hoang's inputs. Update due 8/22.  
02/09/2005 - Try to get initiator's approval to merge this CDR action item with AMS-CDR-4-20 (OPMT action item AMS\_02-CDR-13 by next CCB. Action item due date was changed to March 31, 2005.  
01/05/2005 - Paul Nemeth/LMSO to ask initiator if this RID can be rolled into RID AMS-CDR-4-18 and Open Action Item AMS\_02-CDR-13.

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-CDR-13

**RID Open Date:** 5/1/2003

**Title:** AMS-CDR-4-20: Power Compatibility and EMC Testing

**Initiator(s):** H. Hoang/PEI  
J. Fu/PEO

**Description:** The EME Control Plan (or equivalent) used to establish the plan for how AMS will be compatible with the ISS EMI requirements is lacking in the CDR package.

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### *Action Item Information*

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**Actionee(s):** Tim Urban/ESCG

**Action Due Date:** 3/31/2005

**Action:** Supply EME control plan.

**Action Status:** 06/29/2005 - Tim Urban/ESCG to update PIH ICD based on Henry Hoang's inputs. Update due 8/22.  
02/09/2005 - Try to get initiator's approval to merge this CDR action item with AMS-CDR-1-18 (OPMT action item AMS\_02-CDR-12 by next CCB. Action item due date was changed to March 31, 2005.  
01/05/2005 - Tim Urban/LMSO to provide status March 2005.

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-PDS\_CDR-06

**RID Open Date:** 4/18/2005

**Title:**

**Intiator(s):** Tim Urban

**Description:**

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### *Action Item Information*

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**Actionee(s):** M. Cova

**Action Due Date:** 10/15/2005

**Action:** Re-evaluate thermal optical properties on the top of the PDS as there are no longer heaters located there (breakdown of MLI vs. white paint). QM & FM different ?

**Action Status:** 8/2/2005 - Awaiting thermal analysis of revised worst hot case.

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## *Open Action Items Report*

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*Open Item Number:* AMS\_02-PDS\_CDR-08

*RID Open Date:* 4/18/2005

*Title:*

*Intiator(s):* Tim Urban

*Description:*

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### *Action Item Information*

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*Actionee(s):* S. Alia

*Action Due Date:* 5/16/2005

*Action:* Add 0.03  $\mu$ F per 3.2.2.2.2.A of SSP 57003, and add verification by design inspection or test.

*Action Status:*

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-PDS\_CDR-09-2

**RID Open Date:** 4/18/2005

**Title:**

**Intiator(s):** Tim Urban

**Description:**

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### *Action Item Information*

---

**Actionee(s):** S. Alia

**Action Due Date:** 5/16/2005

**Action:** Update document for maximum operating temperature of 51°C.

**Action Status:** 8/2/2005 - MOT should be changed to match updated worst case hot temperature.

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## *Open Action Items Report*

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*Open Item Number:* AMS\_02-PDS\_CDR-14

*RID Open Date:* 4/18/2005

*Title:*

*Intiator(s):* Tim Urban

*Description:*

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### *Action Item Information*

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*Actionee(s):* S. Alia

*Action Due Date:* 5/16/2005

*Action:* Will move the lower 8AWG label in Figure 4-2 so that it is not close to EBCS wires.

*Action Status:*

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## *Open Action Items Report*

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*Open Item Number:* AMS\_02-PDS\_CDR-17

*RID Open Date:* 4/18/2005

*Title:*

*Intiator(s):* Tim Urban

*Description:*

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### *Action Item Information*

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*Actionee(s):* S. Alia

*Action Due Date:* 5/16/2005

*Action:* Will verify value of capacitance in section 10.1.1.

*Action Status:*

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-PDS\_CDR-19

**RID Open Date:** 4/18/2005

**Title:**

**Intiator(s):** Tim Urban

**Description:**

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### *Action Item Information*

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**Actionee(s):** S. Alia

**Action Due Date:** 5/16/2005

**Action:** Delete existing Figure 4.8.1 and add reference to Grounding and Bonding Diagram in ICD.

**Action Status:** 8/2/2005 - G&B Diagram sent out for review - to be updated based on comments from Collaboration.

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## *Open Action Items Report*

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***Open Item Number:*** AMS\_02-PDS\_CDR-23-2

***RID Open Date:*** 4/18/2005

***Title:***

***Intiator(s):*** Tim Urban

***Description:***

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### *Action Item Information*

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***Actionee(s):*** S. Alia

***Action Due Date:*** 5/16/2005

***Action:*** Update design description document with T0 power characteristics.

***Action Status:*** 8/2/2005 - Update should include SSRMS power characteristics as well.

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-Thermal\_CDR-03

**RID Open Date:** 4/4/2005

**Title:** Design Pressures Based on Operational Temperature

**Intiator(s):** Chris Tutt/ESCG

**Description:** In each specification, the requirement states “The LHP shall be designed for an internal Maximum Operating Pressure which is equal to the vapour pressure of the working fluid at Maximum Operating Temperature.” The LHP should instead be designed to survive the Maximum Design Pressure, which will be the larger of either the pressure of the working fluid at the maximum survival temperature or, for those LHPs using ammonia as the working fluid, the maximum pressure that could occur in a trapped volume if the ammonia were to freeze and undergo local thawing.

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### *Action Item Information*

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**Actionee(s):** M. Molina/CGS

**Action Due Date:** 6/15/2005

**Action:** Replace Maximum Operating Pressure with Maximum Design Pressure and change description of required calculations to match.

**Action Status:** 8/3/2005 - Issue reviewed at TWG and MDP calculation assumptions defined for each pressure system. Maximum design temperatures provided by CGS 8/3. MDP calculations in work, but clearly heater circuits will be safety critical.  
5/25/2005 - Leland Hill working this issue with Reinhard Schlitt. MDP calculation under review.

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-Thermal\_CDR-06

**RID Open Date:** 4/4/2005

**Title:** CAB MLI Discrepancy

**Intiator(s):** Chris Tutt/ESCG

**Description:** DISCREPANCY

*Section 3.3 of the CAB LHP Freezing Assessment states that MLI is needed over the cylindrical spring section of the LHP and the section running across the top of the CAB. These areas do not appear to be covered by MLI based on the description in the CAB section of the MLI document.*

### *SUGGESTED SOLUTION*

*Add drawing to MLI description showing where CAB MLI is located relative to the CAB LHP. Add MLI to cover required sections of CAB LHP if not currently present.*

### *SUPPLIER'S RESPONSE*

*We' ll do that as the CAB TCS design is completed.*

---

### *Action Item Information*

---

**Actionee(s):** Marco Molina/CGS

**Action Due Date:** 6/15/2005

**Action:** *Add drawing to MLI description showing where CAB MLI is located relative to the CAB LHP. Add MLI to cover required sections of CAB LHP if not currently present.*

**Action Status:** 8/3/2005 - Final MLI design on hold pending final CAB analysis - scheduled for closure on 9/15.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-09-2

**RID Open Date:** 4/4/2005

**Title:** Touch Temperature and Ammonia Freezing Analysis

**Intiator(s):** Chris Tutt/ESCG

**Description:** Report does not address analysis of TCS hardware for safety requirements during LTA phases.

---

### *Action Item Information*

---

**Actionee(s):** Marco Molina/CGS

**Action Due Date:** 6/15/2005

**Action:** Provide data on worst case cold temperatures for all heat pipes and loop heat pipes containing ammonia as working fluid or verification that freezing does not present a problem.

**Action Status:** 8/2/2005 - On hold pending finalization of CAB LHP design.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-14

**RID Open Date:** 4/4/2005

**Title:** E-Crate bolt analysis

**Intiator(s):** Bruce Sommer/ESCG

**Description:** Only the analysis for the bolts joining the E-Crate to the USS-02 and the E-Crate Walls to the Bottom Plate are documented in the report.

---

### *Action Item Information*

---

**Actionee(s):** R. Zambra/CGS

**Action Due Date:** 6/15/2005

**Action:** Update the report to show analysis for all structural bolted joints in E-Crate.

**Action Status:** 8/4/2005 - Analysis received and under review at JS. Formal document updates awaiting contract resolution.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-15

**RID Open Date:** 4/4/2005

**Title:** Inconsistent NAS1351 Bolt Yield Strengths

**Intiator(s):** Bruce Sommer/ESCG

**Description:** DISCREPANCY

*Yield strength for NAS1351 bolts in OHB report is not the same as the yield strength for the same fastener type in the CGS report. This is consistent for all OHB v.s. CGS reports.*

*Bolt NAS1351*

*OHB Yield Allowable 950 MPa (138 ksi)*

*CGS Yield Allowable 827 MPa (120 ksi)*

---

### *Action Item Information*

---

**Actionee(s):** Marco Molina/CGS

**Action Due Date:** 6/15/2005

**Action:** *Find the documentation that verifies the yield strength of the fastener and update all reports to include the same allowable for the same bolt type.*

**Action Status:** 8/3/2005 - Action reassigned to Marco Molina.

*05/06/05 - Updated document received and is under review.*

*04/25/05 - Procurement specifications FFS86E for NAS1351 fasteners was sent to CGS and OHB on 04/25/05. Page 7 of the document shows a minimum yield strength for these bolts is 120 ksi.*

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-17

**RID Open Date:** 4/7/2005

**Title:** Insert test and its applicability to different size of insert

**Intiator(s):** H. C. Lo/NASA-JSC

**Description:** DISCREPANCY

Three inserts, with size 3 fastener and face sheet of material 2024, were tested. The requirement to test 12 more insert has been planned. The upcoming test will use 6061 material face sheet. Also, there are two types of inserts, namely size 3 and size 4. The test result based on size 3 and 2024 will be deemed applicable to size 4 and 6061. Rationale has to be provided to make this jump of application.

---

### *Action Item Information*

---

**Actionee(s):** Marco Molina/CGS

**Action Due Date:** 6/15/2005

**Action:** Test result has to be presented and rationale given for the test applicability to cover size 4 insert and different face sheet material 6061. Test proposal end of April. Perform test ASAP

**Action Status:** 8/3/2005 - Actionee changed to Marco Molina.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-18

**RID Open Date:** 4/4/2005

**Title:** Bimetallic Transition

**Intiator(s):** H. C. Lo/NASA-JSC

**Description:** Material corrosion can be a concern for bimetallic transition for long duration operation.

---

### *Action Item Information*

---

**Actionee(s):** Marco Molina/CGS

**Action Due Date:** 6/15/2005

**Action:** Clarification required. Provide information on the connection materials.

**Action Status:** 8/3/2005 - Actionee changed to Marco Molina.

7/15/2005 - Weld protocol received, additional questions sent to TAIS.

6/22/2005 - Dan Rybicki sent additional questions to OHB about plasma weld protocol.

6/17/2005 - Bimetallic weld information forwarded to Dan Rybicki for review.

5/10/2005 - Per email from Marco Molina/CGS, he requested initiator (Dr. Lo) to agree on the answer.

Reply has not been received yet, so action is still open.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-29

**RID Open Date:** 4/4/2005

**Title:** Integration of crates onto main radiator panel

**Intiator(s):** H. C. Lo/NASA-JSC

**Description:** DISCREPANCY  
Tolerance analysis is not presented.

### *SUGGESTED SOLUTION*

*Present the tolerance analysis or installation procedure for successful installation.*

*SCREENING PANEL CHAIRPERSON SIGNATURE*  
*H LO (JSC)*

*BOARD DISPOSITION*  
*Perform the tolerance analysis*

---

### *Action Item Information*

---

**Actionee(s):** R. Zambra/CGS

**Action Due Date:** 5/15/2005

**Action:** Perform the tolerance analysis and present the tolerance analysis or installation procedure for successful installation.

**Action Status:** 8/3/2005 - Analysis on hold pending revision of CGS contract.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-42

**RID Open Date:** 4/4/2005

**Title:** Typo's

**Intiator(s):** Craig Clark/ESCG

**Description:** DISCREPANCY

*Typos: remarks suggest "worst hot case", but should read "worst cold case" in tables 8-21, 8-23, 8-25, 8-27, 8-28, 8-29, 8-38, 8-42, 8-43*

### *SUGGESTED SOLUTION*

*Correct typos in next release.*

### *SUPPLIER'S RESPONSE*

*Next issue of the report will contain right labelling*

---

### *Action Item Information*

---

**Actionee(s):** Marco Molina/CGS

**Action Due Date:** 7/31/2005

**Action:** Correct typos in next release.

**Action Status:** 8/3/2005 - Document update on hold pending revision of CGS contract.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-56

**RID Open Date:** 4/4/2005

**Title:** CAB Heaters

**Intiator(s):** Craig Clark/ESCG

**Description:** DISCREPANCY  
CAB heaters are not defined.

### *SUGGESTED SOLUTION*

*Provide design details for CAB heaters*

### *SUPPLIER'S RESPONSE*

*CAB design to be completed yet.  
Details to be provided after design completion.*

---

### *Action Item Information*

---

**Actionee(s):** Christian Vettore/CGS

**Action Due Date:** 8/1/2005

**Action:** Provide design details for CAB heaters.

**Action Status:** 8/3/2005 - CGS provided updated CAB cold case temperatures to CRISA for heater sizing. Final design expected 9/15/2005. Actionee changed to Christian Vettore.  
6/5/2005 - Date changed to 8/1/2005 to allow for CAB model improvements.  
5/19/05 Heaters cannot be sized until CAB design is complete. On agenda for Madrid.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-57

**RID Open Date:** 4/4/2005

**Title:** TRDGB heaters

**Intiator(s):** Craig Clark/ESCG

**Description:** DISCREPANCY

*Analysis of TRDGB heaters not provided.*

### *SUGGESTED SOLUTION*

*Provide analysis for TRDGB heaters*

### *SUPPLIER'S RESPONSE*

*Failure on analysis will be done by TRDGB thrmal responsible.*

---

### *Action Item Information*

---

**Actionee(s):** Craig Clark/ESCG

**Action Due Date:** 6/1/2005

**Action:** Provide analysis for TRDGB heaters.

**Action Status:** 8/3/2005 - Craig Clark to get contract status from Ulrich Becker to quell disquieting rumors.  
5/19/05 - Analysis is on hold pending signed contract between JS and ETH/MIT.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-60

**RID Open Date:** 4/4/2005

**Title:** Crate radiator heaters

**Intiator(s):** Craig Clark/ESCG

**Description:** DISCREPANCY:  
Crate radiator heaters are not defined.

**SUGGESTED SOLUTION**

Provide details for crate radiator heaters.

---

### *Action Item Information*

---

**Actionee(s):** Christian Vettore/CGS

**Action Due Date:** 8/15/2005

**Action:** Provide PDS heater design allowing box to warmed to switch-on temperature with only one power feed at arm voltage levels.

**Action Status:** 5/27/2005 - Heater details provided, but warming the PDS was found to require both A&B power feeds. Only one feed will be available while on the arm. CGS to work issue.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-61

**RID Open Date:** 4/4/2005

**Title:** MLI mass budget

**Intiator(s):** Craig Clark/ESCG

**Description:** No indication that mass is budgeted for MLI of CAB LHP or MLI of Cryo LHP.

---

### *Action Item Information*

---

**Actionee(s):** Marco Molina/CGS

**Action Due Date:** 8/1/2005

**Action:** Make sure all MLI is accurately accounted for in TCS Mass budget.

**Action Status:** 8/2/2005 - Required blanket sizes and mass estimate assumptions agreed at TWG meeting. Updated mass calculation in work.

6/8/2005 - Date changed to 8/1, on agenda at next TWG meeting.

5/06/05 - Need CAB design to complete MLI estimate.

4/27/05 - TCS mass budget presented at the April TIM, but it was rejected. Mike Capell/AMS requested that a new due date be assigned to CGS. Craig Craig/ESCG to coordinate with CGS.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-62

**RID Open Date:** 4/4/2005

**Title:** MLI configuration and mass

**Intiator(s):** Craig Clark/ESCG

**Description:** MLI blankets are shown with beta-cloth only on the outside and VDA/Mylar/VDA on the inside. Mylar is prone to tearing and the VDA could cause electrical shorts. For durability beta-cloth may be required on both sides for some blankets. This would increase mass. No attachment (grommets, standoffs, etc.) are indicated in the mass estimates. For some blankets this could be a significant percentage of total mass. Overall mass estimates seem low.

---

### *Action Item Information*

---

**Actionee(s):** Marco Molina/CGS, John Cornwell/EC

**Action Due Date:** 8/1/2005

**Action:** Verify all MLI configurations are adequate for durability and electrical considerations.  
Make sure attachments are considered in mass estimates.  
Recheck all MLI mass estimates.

**Action Status:** 8/3/2005 - Durability and electrical grounding requirements defined at TWG, which defines required Beta cloth. Updated mass estimates in work, but awaiting development of AMS-02 blanket specification.  
6/5/2005 - Date changed to 8/1, on agenda at next TWG Meeting.  
5/19/2005 - On agenda for Thermal Meeting in Madrid, 5/30-6/1.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-68

**RID Open Date:** 4/4/2005

**Title:** TRD Attitudes

**Intiator(s):** Craig Clark/ESCG

**Description:** TRD was only analyzed in 2 ISS attitudes, both at  $\beta = +75^\circ$ . This is not enough to determine if all requirements are met.

---

### *Action Item Information*

---

**Actionee(s):** R. Schlitt/OHB, C. Clark/ESCG

**Action Due Date:** 6/15/2005

**Action:** Analyze TRD for the entire range of ISS attitudes and beta angles. Also all STS free flying, docked on ISS, and handoff cases.

**Action Status:** 8/3/2005 - Initial TRD results presented at TWG look promising, but some model refinements were identified.  
6/5/1005 - TRD thermal model to be increased to 15 nodes. Still to be verified whether 15 nodes will be sufficient.  
5/19/2005 - OHB will perform analyses considering all attitudes and transients. This will be done after a TVT test and subsequent TRD model update.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-69-1

**RID Open Date:** 4/4/2005

**Title:** UPS requirements

**Intiator(s):** Craig Clark/ESCG

**Description:** DISCREPANCY

*There is no non-op limit specified for the UPS. The non-op limit should be -40 to +50C.*

*The UPS must be able to operate whenever the magnet is charged, but need only stay within non-op limits when the magnet is not charged (like when AMS-02 is in the Payload Bay).*

*CUPS should read UPS.*

---

### *Action Item Information*

**Actionee(s):** Craig Clark/ESCG

**Action Due Date:** 6/15/2005

**Action:** Provide thermal environments to CGS for inclusion in thermal ICD.

**Action Status:** 8/3/2005 - Craig Clark to provide latest UPS temperatures and TVT profiles to CGS for evaluation.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-69-2

**RID Open Date:** 8/3/2005

**Title:** UPS requirements

**Intiator(s):** Craig Clark/ESCG

**Description:** ISCREPANCY

*There is no non-op limit specified for the UPS. The non-op limit should be -40 to +50C.*

*The UPS must be able to operate whenever the magnet is charged, but need only stay within non-op limits when the magnet is not charged (like when AMS-02 is in the Payload Bay).*

*CUPS should read UPS.*

---

### *Action Item Information*

---

**Actionee(s):** Marco Molina/CGS

**Action Due Date:** 6/15/2005

**Action:** Update Thermal ICD Table 8.2 to read:

*UPS Operational Range (magnet charged) -25 to +50C.*

*UPS Non-operation Range (magnet uncharged) -40 to +50C.*

*Change all references from CUPS to UPS.*

**Action Status:**

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-77

**RID Open Date:** 4/4/2005

**Title:** (PRELIMINARY?) Thermal ICD

**Intiator(s):** Mike Capell/AMS

**Description:** DISCREPANCY

Why is this (still) called

PRELIMINARY THERMAL REQUIREMENTS FOR AMS02 INTERNAL INTERFACES

^^^^^^^^

SUGGESTED SOLUTION

Need comments

SUPPLIER'S RESPONSE

Will be eliminated in next issue

ADDITIONAL COMMENTS

Change name on working draft now.

---

### *Action Item Information*

**Actionee(s):** Marco Molina/CGS

**Action Due Date:** 7/31/2005

**Action:** Will be eliminated in next issue

**Action Status:** 8/3/2005 - Document updates on hold pending revision of CGS contract.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-78

**RID Open Date:** 4/4/2005

**Title:** UPS temps LTA

**Intiator(s):** Mike Capell/AMS

**Description:** So far (and I've only gotten to STS docked but AMS still in bay) some of the temperatures look pretty cold (less than -30C). Of course the magnet is not charged, but the thermal ICD lists the min temp as -25C.

---

### *Action Item Information*

---

**Actionee(s):** Marco Molina/CGS

**Action Due Date:** 7/31/2005

**Action:** UPS requirements updated in next issue of ICD.

**Action Status:** 8/3/2005 - Document updates on hold pending revision of CGS contract.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-Thermal\_CDR-82

**RID Open Date:** 4/4/2005

**Title:** CAB Heater Schematic

**Intiator(s):** Mike Capell/AMS

**Description:** DISCREPANCY

*Looking at Fig 4-2, pg 20, I see that the thermostats for the CAB are both placed on the return line from the heaters. Is there a reason for this ? Usually we have been placing the first one on the return line and the second one on the input line because we understood this was the "normal practice". I don't think it makes much difference - but we should stick to one way or the other, no ?*

*SUGGESTED SOLUTION*

*Need comments*

*SUPPLIER'S RESPONSE*

*Will be fixed*

---

### *Action Item Information*

**Actionee(s):** Marco Molina/CGS

**Action Due Date:** 8/1/2005

**Action:** Figure needs to be fixed.

**Action Status:** 8/3/2005 - Document updates on hold pending revision of CGS contract.

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-TTCS\_PDR-01

**RID Open Date:** 4/4/2005

**Title:** Detail Finite element model for the thermal bar and other related structures not available for review

**Intiator(s):** H. C. Lo/NASA-JSC

**Description:** DISCREPANCY:

Detail finite element model for the thermal bar and other related structures is not presented in detail in the subject document for review. In addition, how the finite element model is constrained is not presented.

SUGGESTED SOLUTION:

Provide detail finite element model for review. If CAD model is available for the evaporator assembly, S&M (structures & Mechanism) would also like to review it.

---

### *Action Item Information*

---

**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** Provide detailed finite element model for review.

**Action Status:**

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-TTCS\_PDR-02

**RID Open Date:** 4/4/2005

**Title:** Thermal bars frequency analysis

**Intiator(s):** H. C. Lo/NASA-JSC

**Description:** DISCREPANCY:

1. There is no figure 11, as mentioned.
2. When TPG material is neglected, the first mode shown is to be 80 hz which is close to a test result of 84 hz. However, when the TPG material is not neglected, the comparable analytical mode (second mode at 152 hz) is much higher than the test result.

**SUGGESTED SOLUTION:**

*Explanation of the discrepancy.*

---

### *Action Item Information*

---

**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to provide explanation of the discrepancy and/or update document.

**Action Status:**

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-TTCS\_PDR-03

**RID Open Date:** 4/4/2005

**Title:** Evaporator tail need a redesign

**Intiator(s):** H. C. Lo/NASA-JSC

**Description:** DISCREPANCY:

1. At the time of this delta CDR, section 6 still indicates a need for evaporator tail redesign due to large deformation. The large deformation is caused by evacuated vacuum case before launch.

SUGGESTED SOLUTION:

Need to present the evaporator tail redesign as soon as possible.

---

### *Action Item Information*

---

**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to provide evaporator redesign details.

**Action Status:**

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-TTCS\_PDR-04

**RID Open Date:** 4/4/2005

**Title:** frequency analysis for thermal bar, evaporator loop and clamp

**Intiator(s):** H. C. Lo/NASA-JSC

**Description:** DISCREPANCY:

frequency analysis was done for each components. This approach is fine as long as each component is isolated to each other. However, there is no clear justification for this.

SUGGESTED SOLUTION:

Present rationale for doing frequency analysis for each component.

Or perform analysis for the complete evaporator assembly.

---

### *Action Item Information*

---

**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to present rationale for doing frequency analysis for each component or perform analysis of complete assembly.

**Action Status:**

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-TTCS\_PDR-05

**RID Open Date:** 4/4/2005

**Title:** Installation deformation figure 15

**Intiator(s):** H. C. Lo/NASA-JSC

**Description:** DISCREPANCY:  
Figure 15 is mention in section 6. But there is no figure 15.

**SUGGESTED SOLUTION:**  
Correct the typo.

---

### *Action Item Information*

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**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to correct typos in next release of document.

**Action Status:**

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-TTCS\_PDR-06

**RID Open Date:** 4/4/2005

**Title:** Installation deformation release

**Intiator(s):** H. C. Lo/NASA-JSC

**Description:** DISCREPANCY:

1. It is not clear how the assembly induced deformation is released after assembly. In one instance, it indicates that the 2mm deformation will be released. And in the other instance, it indicates that the 10 mm deformation is not acceptable and requires a evaporator tail redesign.
2. It is not clear how to measure the induced installation deformation. Or is there such a procedure to measure the installation deformation.

**SUGGESTED SOLUTION:**

1. Clarification required.
2. Implement a procedure to measure the installation deformation and set a range of acceptable installation deformation.

---

### *Action Item Information*

---

**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to clarify requirement and provide detail on how deformation will be measured.

**Action Status:**

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-TTCS\_PDR-07

**RID Open Date:** 4/4/2005

**Title:** Visual inspection of the weld and fracture analysis

**Intiator(s):** H. C. Lo/NASA-JSC

**Description:** DISCREPANCY:

1. Since visual inspection will be the inspection method for post-test verification, when perform fracture analysis, the minimum crack size has to be conforming to the inspection method.
2. Is there a structural analysis performed on the welds, including fracture analysis, as required?
3. Welding is performed at room temperature. During operation, the weld will be at a much lower temperature. How do we guarantee that the weld will be performing at a much lower temperature, possibly due to residual stress?

**SUGGESTED SOLUTION:**

Present strength and fracture analysis.

---

### *Action Item Information*

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**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to provide strength and fracture analysis

**Action Status:**

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-TTCS\_PDR-08

**RID Open Date:** 4/4/2005

**Title:** Leak integrity test still TBD

**Intiator(s):** H. C. Lo/NASA-JSC

**Description:** DISCREPANCY:  
Leak Integrity test still is listed as TBD.

**SUGGESTED SOLUTION:**  
Establish leak integrity test procedure as soon as possible.

---

### *Action Item Information*

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**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to provide leak integrity test procedure

**Action Status:**

---

## *Open Action Items Report*

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**Open Item Number:** AMS\_02-TTCS\_PDR-09

**RID Open Date:** 4/4/2005

**Title:** TTCS tube routing

**Intiator(s):** H. C. Lo/NASA-JSC

**Description:** DISCREPANCY:

*TTCS tube routing goes along the strut into Ram and Wake radiator. Since RAM and WAKE radiator is a much flexible structure, thus it is subjected to a large deformation and deflection. How the TTCS tube routing is attached to the strut is not clear. How the TTCS tube is attached to the strut and how it is routed into the radiator can affect the stress in the tube.*

**SUGGESTED SOLUTION:**

*Present detail information about the TTCS tube routing into RAM and WAKE radiator for review.*

---

### *Action Item Information*

---

**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to provide details of TTCS tube routing

**Action Status:**

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-TTCS\_PDR-10

**RID Open Date:** 4/4/2005

**Title:** Negative safety margin

**Intiator(s):** H. C. Lo/NASA-JSC

**Description:** DISCREPANCY:

*Negative safety margins are shown in the analysis. Though the analysis is stated as rough analysis since detail information on components at this time is still not available, suggested remedy was not presented. Or different analysis approach is not attempted.*

**SUGGESTED SOLUTION:**

*Since this is a delta CDR, remedy for negative safety margin should be provided. The remedy can be re-design of the base plate/fasteners. Or the analysis can be re-done with different approach to show a positive safety margin. Leaving negative safety margin as presented is not desirable.*

---

### *Action Item Information*

---

**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to provide remedy for any negative margins of safety presented at PDR.

**Action Status:**

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-TTCS\_PDR-11

**RID Open Date:** 4/4/2005

**Title:** Bolt and insert analysis

**Intiator(s):** H. C. Lo/NASA-JSC

**Description:** DISCREPANCY:

1. how the bolt analysis is done is not presented in the subject document.
2. bolt and insert technical information is not presented in the document.
3. it is not clear that pre-load is considered in the bolt in the analysis.

**SUGGESTED SOLUTION:**

*Provide information and specification on bolts and inserts used.*

*Provide bolt and insert detail analysis, including applicable document for bolt analysis and demonstrate that bolt analysis is compliant with the applicable document.*

---

### *Action Item Information*

---

**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to provide bolt details and analysis for TTCS box.

**Action Status:**

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-TTCS\_PDR-12

**RID Open Date:** 4/4/2005

**Title:** Finite element analysis approach and fastener analysis

**Intiator(s):** H. C. Lo/NASA-JSC

**Description:** DISCREPANCY:

1. "All box masses (including inside components) are modelled as uniformly distributed over the baseplate top face..." The box itself is not connected to the base plate. And the box has its own fastening point with USS. This assumption can be in error.
2. components/baseplate interface are connected with fasteners. It appears that there is no information on these. As such, no analysis on these fasteners.
3. No analysis provided on components within TTCB.

**SUGGESTED SOLUTION:**

Provide information when available.

Re-do analysis as appropriate.

The components inside TTCB has to be defined as soon as possible.

---

### *Action Item Information*

**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to provide design detail and finite element analysis of TTCB components.

**Action Status:**

---

## *Open Action Items Report*

---

**Open Item Number:** AMS\_02-TTCS\_PDR-14

**RID Open Date:** 4/4/2005

**Title:** TTCS fluid

**Intiator(s):** Klaus Luebelsmeyer

**Description:** DISCREPANCY:  
Using CO2 puts severe issues about freezing

**SUGGESTED SOLUTION:**

Investigate impact of using alternative fluids with lower melting point, like propylene.

---

### *Action Item Information*

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**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to investigate alternatives to CO2 to avoid freezing.

**Action Status:**

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-TTCS\_PDR-15

**RID Open Date:** 4/4/2005

**Title:** OUT-OF-DATE informations

**Intiator(s):** Mike Capell/AMS

**Description:** DISCREPANCY:

*The electronics description in the Pump requirements document (24 Jan 2005) is extravagantly out-of-date.*

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### *Action Item Information*

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**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to update Pump requirements Document

**Action Status:**

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-TTCS\_PDR-16

**RID Open Date:** 4/4/2005

**Title:** DTS missing

**Intiator(s):** Mike Capell/AMS

**Description:** DISCREPANCY:

*Just looking at your figure 3-1 (Primary loop schematic), I was wondering that you don't measure the temperature on the return line from the tracker. Then I realized these are not needed as they are measured by the DTS within the tracker volume. Maybe this should be indicated somehow.....*

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### *Action Item Information*

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**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to provide description TTCS temperature measurement.

**Action Status:**

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-TTCS\_PDR-17

**RID Open Date:** 4/4/2005

**Title:** Welding on Magnet

**Intiator(s):** Mike Capell/AMS

**Description:** DISCREPANCY:

Ref your remark 2, pg 9, welding on the magnet is "impossible". I would say this is not the case. I would say it is to be avoided if possible.

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### *Action Item Information*

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**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to update document as suggested in next release.

**Action Status:**

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-TTCS\_PDR-18

**RID Open Date:** 4/4/2005

**Title:** Heaters Wiring

**Intiator(s):** Mike Capell/AMS

**Description:** DISCREPANCY:

Ref Table 3-2, pg 14, it mentions the survival heaters tracker radiators are connected to the TTPD A-side and B-side. Of course they are connected to the PDS A-Side and B-side.

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### *Action Item Information*

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**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to update document as suggested in next release

**Action Status:**

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-TTCS\_PDR-19

**RID Open Date:** 4/4/2005

**Title:** TTCrate location

**Intiator(s):** Mike Capell/AMS

**Description:** DISCREPANCY:

Ref Fig 3-8, pg 16, TTCE location is shown incorrectly. It is on the bottom crate row. See attached CGS dwg. Of course I call it the TT-Crate. Of course the TTPD is still in the location indicated,

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### *Action Item Information*

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**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to update document as suggested in next release

**Action Status:**

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-TTCS\_PDR-20

**RID Open Date:** 4/4/2005

**Title:** Modes Missing

**Intiator(s):** Mike Capell/AMS

**Description:** DISCREPANCY:

Usually a document like this contains a table summarizing the first N modes (their frequency and effective mass).

It is not noted that this is being/has been performed, just a few pictures (Fig 17,18,19) are included without reference.

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### *Action Item Information*

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**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to provide more details in the structural analysis report.

**Action Status:**

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-TTCS\_PDR-21

**RID Open Date:** 4/4/2005

**Title:** TTCB Missing Cover

**Intiator(s):** Mike Capell/AMS

**Description:** DISCREPANCY:  
TTCB doesn't have a cover

**SUGGESTED SOLUTION:**  
TTCB must be a closed box to enclose equipments located on the main structural plate

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### *Action Item Information*

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**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/15/2005

**Action:** NLR to provide details on how the TTCB will be covered.

**Action Status:**

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-TTCS\_PDR-23

**RID Open Date:** 4/4/2005

**Title:** Missing Analysis

**Intiator(s):** Craig Clark/ESCG

**Description:** DISCREPANCY:  
No analysis results were provided for Tracker or TTCS

**SUGGESTED SOLUTION:**  
Provide analysis results

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### *Action Item Information*

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**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 7/31/2005

**Action:** NLR to provide temperature results for Tracker internals and TTCS system.

**Action Status:**

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-TTCS\_PDR-25

**RID Open Date:** 4/4/2005

**Title:** TTCS Heater Controls

**Intiator(s):** Craig Clark/ESCG

**Description:** DISCREPANCY:

*TTCS heater controls and interlocks are not well defined. Heaters that are not two-fault tolerant need to be shown by analysis not to cause a safety problem.*

*Start-up heaters on tubing currently have no thermostats.*

**SUGGESTED SOLUTION:**

*Provide details for TTCS heater control (computer control, thermostats, etc). Show that all heaters are two-fault tolerant or show by analysis that a failed on heater will not cause a safety problem.*

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### *Action Item Information*

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**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 6/30/2005

**Action:** NLR to provide details of Line heaters, including interlocks and failure analysis.

**Action Status:** 8/3/2005 - Heaters will clearly be safety critical, so Craig Clark and Leland Hill to define required safety verifications.

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-TTCS\_PDR-26-1

**RID Open Date:** 4/4/2005

**Title:** TTCS Manifold Attachment

**Intiator(s):** Craig Clark/ESCG

**Description:** DISCREPANCY:

*The Upper Vacuum Case Joints may not be suitable for mounting the TTCS manifolds due to undesirable temperature extremes. This is critical to avoid CO2 freezing in the manifolds.*

**SUGGESTED SOLUTION:**

*Results of integrated thermal analysis need to be reviewed and a suitable mounting location identified.*

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### *Action Item Information*

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**Actionee(s):** Johannes Van Es/NLR  
Marco Molina/CGS

**Action Due Date:** 6/15/2005

**Action:** NLR to work with CGS and NASA/ESCG to identify possible locations for mounting TTCS manifolds.

**Action Status:** 8/3/2005 - Preliminary thermal analysis shows that proposed manifold locations are marginal at best. Reviews of the rest of the structure for other locations are underway, but it is not clear that any location exists that will meet freezing requirements. Craig Clark to arrange meeting with safety community and discuss options.

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-TTCS\_PDR-26-2

**RID Open Date:** 4/4/2005

**Title:** TTCS Manifold Attachment

**Intiator(s):** Craig Clark/ESCG

**Description:** DISCREPANCY:

*The Upper Vacuum Case Joints may not be suitable for mounting the TTCS manifolds due to undesirable temperature extremes. This is critical to avoid CO2 freezing in the manifolds.*

**SUGGESTED SOLUTION:**

*Results of integrated thermal analysis need to be reviewed and a suitable mounting location identified.*

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### *Action Item Information*

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**Actionee(s):** Marco Molina/CGS

**Action Due Date:** 7/15/2005

**Action:** CGS to provide interface temperatures at proposed locations defined in OPMT item AMS\_02-TTCS\_PDR-26-1.

**Action Status:**

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## *Open Action Items Report*

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**Open Item Number:** AMS\_02-TTCS\_PDR-27

**RID Open Date:** 4/4/2005

**Title:** TTCS Thawing

**Intiator(s):** Craig Clark/ESCG

**Description:** DISCREPANCY:

*After an extended loss of power the CO2 in the radiator may freeze and the freezing will propagate along the tube, stopping before it get to the manifolds. Heaters will be used to first thaw the lines from the manifold end. After tubes are thawed, radiator heaters will be turned on. A safety problem may exist if radiator heaters are turned on before manifold lines are thawed. Heaters are controlled from ground command via the TTCE. There are currently no interlocks to prevent the radiator heaters turning on before the lines are thawed.*

**SUGGESTED SOLUTION:**

*Determine if there is any possibility to make this thawing process two-fault tolerant. If not provide a description of the thawing process and operational constraints to assure no inadvertent thawing of the radiator. This will need to be accepted by the safety panel.*

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### *Action Item Information*

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**Actionee(s):** Johannes Van Es/NLR

**Action Due Date:** 6/30/2005

**Action:**

**Action Status:** 8/4/2005 - JS met with Glenn Ecord and Nick Martinez and identified an acceptance plan for certifying the current design. Bruce Sommer to summarize and send specific data requests with NLR.  
6/29/2005 - First test successful with no ruptures. NASA still waiting for test plans, test data, or any description of test results longer than two or three sentences.